In the Claims

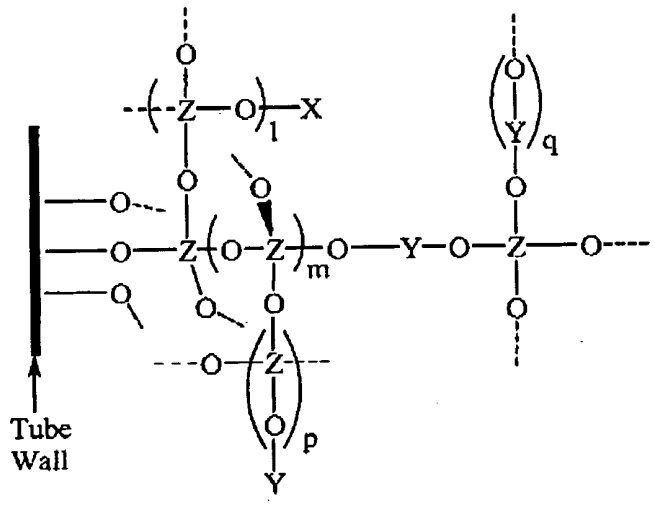
Claims 1-20 (Canceled).

21. (New) A capillary gas chromatographic column comprising:

a tube structure with an inner surface containing at least one sol-gel-active functional group on the inner surface; and

a deactivated, surface bonded sol-gel coating further comprising a non-crosslinked organic-inorganic composite on a portion of the tube structure to form a stationary phase coating on that portion of the tube structure, said deactivated stationary phase sol-gel coating enabling separation of analytes while minimizing adsorption of analytes on the sol-gel coated tube structure; wherein said deactivated stationary phase sol-gel coating is deactivated at the inner surface of said tube structure and within the coating.

22. (New) The capillary gas chromatographic column according to claim 21, wherein said deactivated surface bonded sol-gel-coating on the portion of the tube structure has the formula:



wherein,

X= Residual of a deactivation agent;

Y= Sol-gel reaction residual of a Sol-gel active organic molecule;

Z= Sol-gel precursor-forming element;

l= an integer ≥ 0;

m= an integer ≥ 0;

n= an integer ≥ 0;

p= an integer ≥ 0;

q= an integer ≥ 0; and

l, m, n, p and q are not simultaneously zero.

23. (New) The capillary gas chromatographic column according to claim 22, wherein the residual of the deactivation reagent is selected from the group consisting of polymethylhydrosiloxane and hexamethyldisilazane.

24. (New) The capillary gas chromatographic column according to claim 22, wherein said sol-gel reaction residue is selected from the group consisting of molecules having hydroxysilane functional groups, molecules having alkoxysilane functional groups, molecules having at least one hydroxysilane group and at least one alkoxysilane group, polydimethylsiloxane (PDMS), polymethylphenylsiloxane (PMPS), polydimethyldiphenylsiloxane (PDMDPS), polyethylene glycol (PEG), polalkylene glycol, and alkyl moieties.

25. (New). The capillary gas chromatographic column according to claim 22, wherein said sol-gel precursor forming element is selected from the group consisting of Si, Al, Ti, and Zr.

26. (New) A method of preparing a capillary gas chromatographic column comprising the steps of:

providing a tube structure having sol-gel-active functional groups;

providing a sol-gel solution comprising:

a sol-gel precursor;

a non-crosslinked organic ligand with at least one sol-gel active functional group;

a sol-gel catalyst;

a deactivation reagent; and

a solvent system including water;

reacting at least a portion of the tube structure with the sol-gel solution under controlled conditions to produce a surface-bonded sol-gel coating on the portion of the tube structure;

expelling the sol-gel solution from the portion of the tube structure; and

heating the coated portion of the tube structure under controlled conditions to cause the deactivation reagent to react with the surface-bonded sol-gel coating to deactivate and to condition the sol-gel coated portion of the tube structure.

27. (New) The method according to claim 26, wherein the step of providing the tube structure comprises providing a tube structure with an inner wall, reacting the sol-gel solution with the inner wall of the tube structure for a period of less than 1 hour to form a surface bonded sol-gel coating on the inner wall of the tube structure, and then applying gas pressure to the sol-gel solution in the tube structure to expel the sol-gel solution from the tube structure.

28. (New) The method according to claim 27, wherein the sol-gel precursor comprises an alkoxy compound, the organic material comprises monomeric or polymeric material with at least one sol-gel active functional group, the sol-gel catalyst is selected from the group consisting of an acid, a base and fluoride compound, and the deactivation reagent comprises a material reactive to hydroxyl groups bonded to the sol-gel precursor forming element or to the tube wall surface.

29. (New) A method of preparing a capillary gas chromatographic column comprising the steps of:

providing a capillary gas chromatographic column comprising at least one sol-gel active functional group containing tube structure; and

creating, coating, immobilizing and deactivating a stationary phase comprising a non-crosslinked organic-inorganic composite coating on the tube structure, wherein said creating, coating, immobilizing, and deactivating occurs in the same step.

30. (New) The method according to claim 29, wherein the immobilization of the stationary phase comprises forming chemical bonds between the stationary phase and the sol-gel active functional group on the capillary wall.

31. (New) The capillary gas chromatographic column according to claim 24, wherein the alkyl moiety comprises octadecyl moiety.

32. (New) The capillary gas chromatographic column according to claim 24 wherein the alkyl moiety comprises an octyl moiety.

33. (New) The capillary gas chromatographic column according to claim 21, wherein the stationary phase coating comprises a sol-gel polymer layer having organic and inorganic components.

34. (New) The capillary gas chromatographic column according to claim 21, wherein the sol-gel-active functional group is derivatized.

35. (New) The method according to claim 29, wherein the step of creating a stationary phase comprises chemically reacting sol-gel active components of an aqueous solution.

36. (New) The method according to claim 29, wherein the tube structure is contacted with the stationary phase, and the stationary phase comprises an organic and inorganic interfacial polymer layer.

37. (New) The method according to claim 29, wherein the stationary phase comprises a sol-gel polymer layer having organic and inorganic components.

38. (New) The method according to claim 29, wherein said deactivating the stationary phase comprises reacting the silanol group with sol-gel active components of a sol solution at substantially the same time as creating the stationary phase coating.

39. (New) The method according to claim 29, wherein deactivating the stationary phase comprises reacting the silanol groups while the tube structure is subjected to heat treatment.

40. (New) The method according to claim 29, wherein said creating, coating, immobilizing, and deactivating occurs in an aqueous solution.